

GRADES OF POWER

0. None
1. Flickers
2. movement if gravity excluded
3. against gravity but not against resistance
4. can move to some degree against resistance
5. Normal

GRADES OF REFLEXES

0. absent
1. reduced, present on reinforcement
2. normal
3. exaggerated but no clonus
4. clonus

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Extensor Plantar

- extension of big toe + fanning, flexion of all others + tensing of facia lata
- – if diabetic wound, then plantar
- then tap foot and observe tensing of facia lata
- Dorsum surface - lateral border
- pinch gastrocnemius muscle
- squeeze achilles tendon
- squeeze along the shin
- ***Pyramidal Pattern (Corticospinal)***
- – can be at spinal cord, brainstem)
- Plantars upgoing
- Brisk reflexes +/- clonus
- SPASTICITY
- Distal more weak than Proximal
- Upper limbs extensors more weak than flexors - (*FOCUS AT ELBOW*)
- Lower Limbs - Flexors more weak than extensors - (*FOCUS AT KNEE*)

SPASTICITY

- Velocity dependant resistance that is not equal in all group of muscles and not uniform throughout full range of movements
- typically in Arm flexors, leg extensors
- ***spasticity Can be treated with BACLOFEN, TIZANIDINE, DANRTROLENE***

RIGIDITY

- Velocity independent resistance to passive movements
- Lead Pipe - uniform resistance throughout movement
- Cog Wheel - jerky resistance
- effect all muscle groups, flexors + extensors
-
- ***Neurogenic Bladder**

1. Cortical (Uninhibited)

- Loss of awareness of bladder fullness - urge incontinence dribbling whenever bladder fills

2. UMN - SPASTIC/HYOERTONIC/AUTOMATIC BLADDER - lesion above level of S2 - repeated contraction, frequent small volume urination

3. LMN - HYPOTONIC/AUTONOMOUS – Lesion at S2-4 – Complete filling and then overflow incontinence

4. Sensory paralytical

5. Motor paralytical

CORTICAL SIGNS

- Speech
 - Acalculia
 - Asteriognosis
 - agraphia
 - **Dominant**
 - write
 - read
 - Finger agnosia
 - right left agnosia
 - **Non dominant**
 - i will write something on your hand, identify and tell me plz
 - i will put something in ur hand, identify and tell me plz
 - Draw a clock
 - **Temporal**
 - short term memory – remember name of these 3 things. i will ask you
 - long term memory
 - **Frontal lobe**
 - grasp reflex
 - tap thenar and look at lower lip - contraction
 - **OCCIPITAL**
 - ask to see an object and tell what it is
-

SCHEMES

PARKINSON

1. Resting hand palm down and lateral view
 2. outstretched hands
 3. Bradykinesia thumb finger or fist
 4. Tone with synkinesis
 5. Face blinking, drooling
 6. Glabellar Tap
 7. Eyes blepharospasm EOM and vertical gaze
 8. Cerebellum
 9. Lower limb Tone with synkinesis and Bradykinesia with Toe Tap
 10. Gait (small step, Brady, posture, arm swing, turning, freezing)
 11. Speech (monotonous, festinating)
 12. olfaction
 13. Orthostatic hypotension
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PTOSIS

- ***unilateral***
- 3rd Nerve
- Horner
- MG
- ***bilateral***
- MG
- Myotonic
- oculopharyngeal dystrophy
-
- ***STEPS***

1. Pick Ptosis
2. pick resting gaze position
3. Light reflex

- ptosis with down out eye is 3rd N
- Ptosis with Constricted pupil is horner
- Ptosis with dilated Pupil is 3rd
- ptosis with Normal pupil is MG or pupil sparing 3rd N in which case eye will be down and out
- ✓✓ Regardless of etiology, Examine all cranial nerves ✓✓
-
- ***3rd Nerve palsy***

- Upper limb - Pronator drift, 1 Power and 1 reflex in upper limb, Finger to Nose test
- Similarly, in lower limbs, check power in 1-2 muscle groups, knee reflex, ankle jerk, plantar
- – Then P6

1. Palpate and auscultate Carotid
2. Prick marks on fingers
3. Pulse
4. Pressure
5. Precordium
6. Palpate Spleen

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• ***if MG***

1. Ceiling test and counting
2. Head lift
3. Jaw opening
4. Upper limbs - quick screen for power with hand grip, and proximal muscles, 1 reflex, Finger nose test

- – – then assess fatiguability in upper limbs
- – – look for autoimmune cluster - MCP squeeze, Rash, vitiligo

5. Lower limbs - quick screen for muscle power in 1-2 groups, knee reflex, plantars
6. Neck scar, double lumen scar, thyroid swelling
7. Chest Expansion Bed sores

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• ***if horner***

1. Neck scar, sinus, wound in neck
2. Then move to hands – Clubbing, Nicotine staining, Muscle wasting, C8T1 sensory, Prick marks
3. Upper limbs - Pronator drift, 1 power, 1 reflex, finger nose
4. Lower limbs screening for Motor sensory and Plantars
5. Pulse, Pressure,
6. Auscultate - Precordium, Lungs for Tumour
7. Palpate Nodes and Spleen

- – In the end, offer ophthalmoscopy

CRANIAL NERVES

- ***1st*** Smell

-
- **2,3,4,6**
- Eyes, Look for ptosis, resting gaze position
- far vision each eye
- near vision each eye
- colour vision each eye
- Pupil with swinging flash light
- EOM with accommodation
-
- **5th and 7th**
- sensory in 3 divisions of 5th Nerve, motor - Clenching of teeth, opening of Jaw
- Show teeth, Blow air, Eye closure, Forehead frowning
- and jaw jerk (may skip this)
-
- **8th** Tuning fork Tests
- first do RINNE - ask which ear stops hearing sound. in that ear do Weber, then in other ear. If AC better in that ear, it means Sensorineural of that ear. if in other ear BC better than AC, it means that ear has conductive deafness
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- **9,10,12** – Cough, open mouth say Aaah (Palate deviation), Tongue protrusion and lateral movements of tongue
-
- **11th** - Neck flex, chin to shoulder, shoulder shrug
-
- – **Then proceed to relevant**

1. Arms

- hand nail Skin muscle joint finger prick palms
- Tone, Power, 1 reflex, Finger Nose

2. Legs

- nail skin muscles joints
- plantars, sensory

3. Pulse, Palpate Carotid, Precordium, Palpate Spleen, Blood pressure

4. Oral cavity and nose for ulcers, mucormycosis

5. Observe gait examination

6. Observe ophthalmoscopy

7. Do Perimetry

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• **FACIAL PALSY LMN**

- – – (PONS - associated V VI and contralateral hemiparesis, CP ANGLE - associated V VI IX X XI XII Cerebellum, EAR - associated hyperacusis and taste ant 2/3, PAROTID)
- Check all other Cranial Nerves
- Inspect ear - back, inside, front
- Uremia look

- palpate for parotid swelling, Lymphadenopathy
- Hands - pin prick, rheumatology
- pulse and BP
- Arms - Power, finger nose
- Legs - wounds, Power, 1 reflex, plantars, sensory
- – BILATERAL FACIAL - GBS, sarcoid, Lymes, Mononeuritis

MULTIPLE CRANIAL NERVES

-
- **CVST - has Neurovascular bundle** - 3,4,6, v1 v2 ICA and Sympathetic chain - do MRV (quickly become bilateral in couple of days)
-
- **SOF is neural bundle** - 3,4,6, V1
-
- **Orbital Apex is neural bundle** - 2, 3,4,6, v1
-
- **Pupil sparing ophthalmoplegia - Myasthenia, thyroid ophthalmopathy, congenital myopathy**
- limb weakness can be seen in CVST if sagittal sinus also involved
- *similar scenario, HTN but no cranial nerve* - occipital lobe lesions - PRES
- Proptosis - indicates retrobulbar pathology. Eye swelling indicates intraocular pathology
- Retro orbital pathology can be Infection (Mucormycosis), Inflammation (Sjogren, sarcoid, Vasculitis), Vascular (Bleed), Mass lesion (Lymphoma, Carcinoma, Hemangioma)
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- **CP ANGLE** - CSF filled space - Medial side there is brainstem, laterally there is petrous part of temporal bone, Roof is cerebellum, Floor is lower cranial nerves
- – – V,VII,VIII (later, IX,X,XI,XII, VI also, and cerebellum also)
- All cranial nerves
- Inspect ear - behind, front, back
- Upper limb - Power, Reflex, coordination
- Lower limb - power reflex plantar sensory
- CAUSES — Acoustic Neuroma, meningioma, Metastasis, Basillar artery aneurysm
-
- **Pons** - V, VI, VII, Contralateral hemiparesis

HEMIPLEGIA

- Gait
- Upper limbs Nerves Speech Cerebellum
- Hands NSMJ, Pulse, Carotid, Precordium, Spleen

- Bed sores, Catheter, Aspiration

SPASTIC PARAPLEGIA

1. Hypertonia
2. hyperreflexia
3. Upgoing plantars
4. Clonus

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- **Tracts**

- Corticospinal (CST), Cerebellum, Dorsal Column (DC), Peripheral Neuropathy (NP)
- – CST + DC + NP + Cerebellum = FA, Arnold Chiari, Vit E Deficiency
- – CST + DC + NP = SACS/ Taboparesis
- – CST + DC + Cerebellum = MS
- – Numbness, tingling in MS is due to involvement of DC. not due to Peripheral NP
- **Cerebral paraplegia**
- – in brain motor homunculus - legs are on inner side, arms on lateral side.
- – paraplegia with cortical signs (Frontal lobe behaviour, seizures, cortical sensory loss)
- – Cortical sensations – 2 point discrimination, Astereognosis, Agnosia
- – Automatic bladder (no social inhibition) - Frontal lobe
- – Autonomic bladder (dribbling with full bladder) - sacral nerves
- **Spastic With Level**
- – – then check
- GAIT
- Upper limbs, Nerves, Speech, Cerebellum
- Hands NSMJ (nails, skin, muscle, joints), Pulse, Nodes, Gibbus, Tongue

1. Compressive

- TB, Trauma, SOL, Abscess, Disc disease
- **In the cord, motor tracts of legs are on outer side, arms are on inner side**
 - External lesion will start as weakness of legs, central lesion will start as weakness of arm
- – – Intramedullary (Ependymoma, Syringomyelia) - ascending suspended dissociative anesthesia, then ant horn cell features, then limb weakness
- – – Intra dural but extra medullary, Root pains are common, weakness is asymmetrical
- – – Extradural (Trauma, TB, Tumour, Disc, Abscess, Mets), Symmetrical involvement, gibbus, spine muscle spasms, pain, Bladder involvement occurs late, Proprioception lost before pinprick, Initial pattern of weakness is UMN

2. Non compressive

- Sensory level is not usually sharp
- Transverse myelitis, MS, NMO, ADEM, Vascular, Paraneoplastic
-
- ***Spastic Without Level***
- – – then check
- GAIT
- Upper limbs, Nerves, Speech, cerebellum
- Hands, Pulse, Nodes, Chest

1. HSP, Cerebral palsy, Bilateral ACA, Parasagittal SOL, MS, MND

-
- ***Spastic With Impaired Position Vibration***
- – – Then check
- GAIT
- Upper limbs, Nerves, Speech, Cerebellum
- Hands, Pulse, Anemia, Murmur
- Bed sores, catheter, Aspiration

1. MAST (MS, Friedrich, SCD, Tabes)

-
- ***Coordination loss***

1. MS

2. FA

-
- ****Spastic with pain loss but intact proprioception***
- Anterior spinal Artery
- ?? Syringomyelia
-
- ***Upgoing plantars with absent Ankle jerk***
- MAST BUT replace MS with MND
- cervical myelopathy with peripheral neuropathy
- Stroke with peripheral neuropathy
- Conus medullaris
-
- ***Syringomyelia***
- Segmental atrophy, Areflexia
- Pain temperature loss in *CAPE* distribution
- With time, cavity expands → UMN features and loss of sensation in lower limb
- Brain stem features mean cavity expanded upward (usually in Arnold Chiari Malformation), Called *SYRINGOBULBIA*
-
- ***Transverse myelitis***
- Inflammation of Cord
- – infection - lyme , EBV

- – Autoimmune - sle, vasculitis, MS, Sjogren
- – Paraneoplastic
- (in MS, transverse myelitis is partial)
-
- ***Cauda Equina lesions***
- nerves that leave cord - LMN lesion
-
- ***Connus Medullaris lesions***
-
- end part of spinal cord - UMN lesion
-
- ***SACD*** - degeneation of CST and DC.
- In some patients, there is also polyneuropathy, mental change and optic neuropathy
- Nitric Oxide interfere with B12 metabolism, and recreational use of inhaled Nitric Oxide produces similar clinical picture
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- ***Friedrich – (Cord, Cerebellum, Peripheral Nerves)****
- Ataxia, Clumsy hand, cerebellar signs
- – in cord, CST and DC are more affected.
- Spastic paraplegia and extensor plantars
- Sensory impairment in gloves and stocking, Absent ankle
- associated with Pes cavus, Hammer toes, optic atrophy, hearing loss, DM, HOCM
- ***OMAVELOXOLONE*** is approved for use in FA after age 15
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- ***Paraplegia in extension*** - partial transaction of cord – Pyramidal tracts involved and extra pyramidal preserved - hip knee extended and foot plantarflexed
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- ***Paraplegia in flexion*** - Complete transaction of cord – Both of Pyramidal + extra pyramidal, involved - Hip knee in flexion and foot dorsiflexion
- ***investigation***
- MRI
- for Cause - ANA and auto antibodies, Blood culture, TB, CT of CAP

DEMYELINATION

- Central - MS, NMO, ADEM
- Peripheral - AIDP, CIDP, MGUS

LMN PARAPLEGIA

- CENTRAL NERVOUS SYSTEM – BRAIN, 1st & 2nd Cranial nerves and spinal cord
- PERIPHERAL NERVOUS SYSTEM – 10 Cranial Nerves and 33 spinal nerves

1. Hypotonia
2. Hyporeflexia
3. Mute or Downgoing planters

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- ***Relevant***

- Upper limbs Nerves Speech Cerebellum
- Hands NSMJ, Pulse, Carotid, Gums, Precordium, Liver, Spleen,
- Thyroid, Cushing, Joints
- Bed sores, Catheter, Aspiration and Tumour
- Autonomic (Tachycardia, Palpate bladder, Thick dry skin , sweating, Orthostatic)

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- ***Flaccid Paraparesis***

- Ant Horn Cells (Polio, Progressive muscular atrophy)
- Roots/plexus (will have radiculopathy like pain)
- Nerves (Peripheral Neuropathy, Motor, sensori-motor, mononeuritis Multiplex)
- Neuromuscular junction (Myasthenia Gravis, periodic paralysis, botulism)
- Muscles (Myopathy, dystrophies, Myositis)

1. Flaccid Paraparesis with **intact reflexes and intact sensation**

- Muscles (Dystrophies, Myopathy, myositis)
- NMJ (Myasthenia, Periodic, Botulism)

2. Flaccid Paraparesis with **impaired sensation and/or hyporeflexia**

- GBS
- CIDP
- ***APPROACH***

1. REFLEXES

- Absent reflexes - indicates Neuropathy (Motor, Sensorimotor)
- Reflexes normal - Myopathy/NMJ disorder (Myopathy, MG, Dystrophies, Periodic paralysis)

2. SENSATIONS

- Sensations Impaired - Neuropathy - and we will say it is *SENSORIMOTOR NEUROPATHY* — (mnemonic – Demyelinating VITAMEN)
- Sensations Normal - could be Myopathy or Neuropathy (in this case distribution of weakness is important – **1** – Proximal weakness more than distal, and adductors weakness more than abductors would favour Myopathy/NMJ , **2** – Distal weakness more as compared to proximal would

favour neuropathy but this Neuropathy is called *MOTOR NEUROPATHY* - (GBS, CIDP 1st episode, Lead, Porphyria)

- Neuropathy mnemonic **Demyelinating VITAMEN drugs**
- Demyelinating conditions
- Vascular (Ischemia, risk factors DM, HTN, smoking, etc, – same as for IHD)
- Infections (TB, HIV etc)
- T - TB, Tumour, Trauma
- Autoimmune
- Metabolic (DM, CKD)
- Endocrine
- Nutritional (b12, vit E)
- Drugs and toxins
- ***Peripheral sensori-motor NP***

1. DM
2. VASCULITIS/Sarcoid
3. ALCOHOL - Cramps, tenderness (Axonal)
4. UREMIA - Symmetrical, LL > UL (Axonal)
5. NUTRITIONAL
6. PARANEOPLASTIC
7. Amyloidosis – initially Sensory and autonomic, later motor also
8. Myeloma - usually SMNP but can be pure motor. (Axonal/segmental Demyelination)
9. Critical illness NP
10. Drugs and Pesticides
11. AMSAN

- ***Peripheral Motor Neuropathy***

1. GBS
2. Lead Poisoning
3. Porphyria - UL > LL (later on, sensory and autonomic np also)
4. First episode of CIDP
5. Botulism - Prevents release of Acetylcholine at NMJ and autonomic synapses – Sudden onset Weakness initially in eyes, face, bulbar muscles, later in limbs. — ***(Aminoglycosides prevents release of Acetylcholine at nerve endings hence produce symptoms similar to botulism but are short lived)***
6. Dapsone
7. Myeloma - usually SMNP , but can be pure motor

- – (if ophthalmoplegia/Cranial Nerves .. then DD is Miller fisher and botulism)
- – mono neuritis (Vasculitis - usually with Rheumatological disease, Arteritis, Sarcoid, Radiation)

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- ***Autonomic Neuropathy***

1. DM
2. AIDP
3. HIV
4. Porphyria
5. Amyloid

6. paraneoplastic

7. vincristine

8. PD plus

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- **LABS** – CBC, LFT, RFT, RBS, HBAIC, ANA, CT CAP, NCS, EMG,
- – in diabetes NCS not very high yield because it effect myelin and unmyeline
- – CSF not very helpful, no diagnostic value

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NEURPATHIES IN DM

- – – Predominantly Axonal, some patchy or segmental Demyelination
- distal Peripheral sensorimotor
- Amyotrophic
- Mononeuritis multiplex
- lumbar radicular plexopathy
- Autonomic
- Entrapment neuropathy
- Insulin neuropathy (sensory)
- Glucose toxicity neuropathy (like GBS)
- hyperosmolar neuropathy (improves with insulin)
- Diet modification leading to Nutritional deficiency neuropathy
-

NUTRITIONAL DEFICIENCY NEUROPATHY

- B12
- Vitamin E - cerebellar
-
- **Axonal**

1. Conduction velocity is normal, Action potential Amplitude is reduced
2. EMG shows denervation

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- **Demyelinating**

1. Conduction velocity is slow, or even blocked, AP Amplitude is normal
2. EMG doesn't show denervation

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- **CIDP vs AIDP**
- Demyelinating NP
- – – AMAN and AMSAN are axonal vairants of GBS (Ganglioside Anribodies)
- peripheral nerves (spinal or cranial) , not Central (MS effects central, not Peripheral)

- – history (duration well localized, preceding Infection) , Examination (Autonomic, respiratory, cranial is GBS) wasting in CIDP, Proprioception impaired in CIDP
- duration - CIDP is more than 2 months, wasting means chronic - CIDP
- No triggering factor, because its defect in immune system while GBS is one time triggered event.
- CIDP can be slow progression, can be rapid progression -
- in AIDP, weakness continues for 4 weeks, improve by 8th week
- AIDP involves mainly Facial nerves and eye nerves, CIDP involves mainly lower cranial nerves
- No role of steroids in AIDP but in CIDP they improve the deficit

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- – – **SUPPORTIVE TREATMENT**

- frequent assessment of muscles
- frequent assessment of autonomic
- for pain
- for bladder
- DVT prophylaxis

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- – **(PLASMAPHERESIS, IVIG)**

- severity - can't walk 10 meters
- duration - less than 4 weeks
- Rapid progression with bulbar involvement
- – Immunomodulatory - using autoimmunity against autoimmunity
- – immunosuppressants - suppressing autoimmunity

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- **Antibodies in neuropathies**

1. antibodies against myelin - AIDP
2. Ganglioside Antibodies (against Axon) – AMAN, AMSAN
3. GQ1b - Miller fisher - GQ1b

- – GBS - infections, vaccines

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- **HSMN**

- Foot deformities (Hammer toe, pes cavus, ulcers), Wasting
- Power reduced, hyporeflexia, Variable impairment of sensations
- Type 1 is Demyelinating, Type 2 is Axonal, Type 3 is segmental Demyelination, Type 4 is defect of phytanic acid metabolism and also has pigmentary retinal degeneration

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- **Porphyria Neuropathy** – Initial symptoms is motor weakness, proximal weakness is more than distal, and upper limbs more involved than lower.

- Sensory symptoms appear and Autonomic symptoms appear late

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- **Amyloid Neuropathy** – Initial symptoms are Sensory and autonomic.

- Motor symptoms appear late

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- **Thickened nerves**

1. Trauma

2. HSMN

3. Acromegaly

4. Sarcoid

5. Amyloid

6. Leprosy

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- **CNS Demyelination** - MS, ADEM, NMO, Leukodystrophy, (SLE, Sjogren, Sarcoid, Bechet)

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- **Peripheral nervous system Demyelination** – AIDP CIDP HSMN1, MGUS neuropathy

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- **ADEMS vs NMO vs MS**

1. Enceph and cortex symptoms – present in ADEMS, not in NMO or MS

2. Optic Neuritis - usually bilateral in ADEM and NMO, unilateral in MS

- – – ON Recovery is Good in MS, and not good in NMO

3. Prodromal illness present in ADEM

4. NMO is grey matter disease, MS is white matter disease

5. AGE – NMO presents late, usually after 30s-40s, monophasic but MS presents early, 20s-30s, ADEM presents in children

6. Recovery - good in MS and ADEM, but NMO may be acute severe and has residual defect

- – – in CNS Demyelination - area postrema of brainstem can be involved --> Vomiting

FLACCID WITH FATIGUABILITY

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- – – ***Most common Association of myasthenia is Thymus, thyroid, RA and SLE***

- Ceiling test and counting

- Head lift

- Jaw opening

- Upper limbs - quick screen for power with hand grip, and proximal muscles, 1 reflex, Finger nose test, then wing beating to assess fatiguability in upper limbs

- Lower limbs - quick screen for muscle power in 1-2 groups, knee reflex, plantars

1. Neck scar, double lumen scar, thyroid swelling

2. Chest Expansion Bed sores

3. Treatment effects - Steroid/cushing features - thin bruised skin, Moon face
acne hirsutism, Striae, purpura
-

MYOPATHY

- *Myopathy myositis*
- Proximal weakness more than Distal muscles
- Extensors more than Flexors
- Adductors more than Abductors
-
- **DD**
- Endocrine Causes (DM, Cushing, Thyroid, Addison)
- Autoimmune/Rheumatological (Dermatomyositis, Polymyositis, SLE, RA)
- Muscular dystrophy
- Metabolic (osteomalacia)
- Paraneoplastic
- Drugs (steroids, statin, Zidovudine, Penicillamine)
-
- **Scheme**
- Ceiling and Counting
- Thymectomy Scar
- Hands (Finger prick marks, sweaty for hyperthyroidism, Tight skin, gottron rash, Joint tenderness and deformities)
- Arms (Pulse Brady for hypothyroidism tachy for hyperthyroidism, Purpura and paper skin for Cushing)
- Face (General look for moon face,dull,anxious,triangular, puckering, rash, wasting, Oral Ulcers)
- BP (high for Cushing, Hypo and hyperthyroid)
- Back (spine scapula hip deformity, Expansion, thyroid , auscultate for Tumour)
- Abdomen (Hepatosplenomegally)
- Gower and Gait
- – (picked by bulk nutrition and power of proximal muscles)
-
- **Myopathy Relevant**
- **Hands** - stigmata of rheumatological disease (joints tenderness and deformity, telangiectasias, sclerodactyly, gottron papules), Hypothyroid (Dry), Hyperthyroid (Moist), DM (pricks, cheiroarthropathy)
- **Pulse** - Hypothyroid (Bradycardia), Hyperthyroidism (Tachy or AFib)
- **Skin** of Hands and Arms . bruising, paper thin skin if Cushing
- **BP** - Cushing, Hypo and hyperthyroidism
- **FACE** General look - hypo or hyperthyroidism, Cushing, SLE, Scleroderma, Acromegaly)
- 4 group of muscles - Eye muscles, Orbicularis oris, Masseter, Temporalis
- **Abdomen** Malignancy visceromegally
- **Precordium** Cardiomyopathy
- **Spine** Kyphoscoliosis

- **Chest** ILD and Expansion

MISCELLANEOUS LESIONS

HAND MUSCLE WASTING

- – – More likely cases in exam
- Cervical myelopathy
- Syringomyelia
- MND
- CIDP
-
- – **Important relevant**
- Check for dissociative sensory loss
- Examine neck, spine for trauma, deformity, gibbus
- Look at tongue for fasciculations and Exaggerated Jaw Jerk
- Lower limb motor and sensory screening
-

- ***Approach***

1. Distribution of wasting

- Median Nerve - Thenar only - (no guttering, no intrinsic) CTS or at elbow
2. Ulnar Nerve - Anatomic snuff box and ulnar border of hand near hypothenar
 3. Thenar, snuff box, dorsal guttering - (Cervical myelopathy, Syringomyelia, MND, CIDP)

-
- ***Sequence of Nerve supply***

1. Ant Horn Cells
2. Cervical roots C8T1
3. brachial plexus
4. Median , Ulnar - supply small muscles of hands

- wasting may well be due to non neurological cause, like Muscles disorder (Myopathy) disorder of Neuromuscular junction, Rheumatological disease, Vascular etiology
-

- ***Pattern of Neurological Lesions causing hand muscle wasting***
-

1. **Cord**

- All muscle wasting
- below C8T1, UMN signs (in legs)
- – Sensory level, bladder - Cervical Myelopathy
- – Dissociative sensory loss - Syringomyelia
-

2. Anterior horn cells

- wasting, fasciculations, Hyperreflexia
- sensory will be normal
-

3. Cervical Roots

- C8T1 (cervical rib, Pancoast tumours) Hand muscle wasting, dermatomal sensory loss Medial 2 fingers and ulnar border
- C7 - triceps reflex lost
-

4. Brachial Plexus

- hand wasting but also whole arm wasting
- sensory loss and reflexes lost
- (Also called FLACCID ARM and FLAIL ARM)
-

5. Neuropathy

- distal muscle wasting
- distal reflex lost
- glove stocking sensory loss
-

6. Myotonia Dystrophica

- Balding
- ptosis
- percussion myotonia
- grip myotonia
-

7. Median Nerve

- Thenar wasting
- Sensory loss lateral 3.5 fingers palmar aspect
-

8. Ulnar

- Wasting in snuff box and ulnar border of hand
- Sensory loss Medial 1.5 fingers palmar aspect

-

9. Radial Nerve

- Wrist drop
-

WRIST DROP

1. Motor examination of upper limb

- – – special focus on power and range of extension at
- Elbow
- Wrist
- fingers
- Thumb (extension + Abduction)

2. Sensory loss

-
- **Steps**
- Raise your both arms (here we will note elbow extension and any wrist drop)
- Extend your Elbow - Normally, then against resistance
- Extend your wrist - Normally, then against resistance (it will be weak)
- Elbow flexion in mid pronation
- Pronation and supination
- Extend your fingers - Normally, then against resistance
- Extend your thumb, abduct your thumb - normally, then against resistance
- Hand Grip (although it checks finger flexion, which is function of Ulnar nerve, but hand grip is weak also in Radial palsy)
- Sensory loss in Anatomical snuff box, post forearm, Arm
-
- **Site of Lesion**

1. Above spiral groove

- Elbow extension is weak
- Wrist drop (wrist extension is weak)
- Finger extension is weak
- thumb extension and abduction is weak
- Sensory loss is widespread

2. In spiral groove

- Elbow extension is normal
- Wrist, fingers and thumb are weak

3. at Elbow

- Elbow and Wrist extensions are normal
 - fingers and thumb weakness
-

FOOT DROP

- Sensory loss Dorsum and lateral foot on right, and lateral calf
- high step gait
- peroneal nerve
- – Causes

1. Trauma (cross legs, squatting, Iatrogenic, splinting)
2. Diabetes
3. Vasculitis, mononeuritis
4. ALS, Motor neuron Disease
5. if bilateral - HSMN

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- **Investigations**

- CBC, RBS, ESR CRP, Antibody and ANCA
- Imaging - xray, ct
- NCS - records transmission through nerve
- EMG - Records response of muscles
- pain, SSRI

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- **Steps**

- same like normal motor sequence
- additional - dorsiflexion and plantar flexion, inversion and eversion
- RELEVANT - back, UL screen, Cranial Nerve screen
- RELEVANT if bilateral - same like this, plus fasciculations, cranial, bulbar

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- **Track**

- roots - lumbosacral plexus - sciatic never - divide into peroneal - supply dorsiflexors
- tibial Nerve

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- **Lesions**

1. Deep peroneal - only dorsiflexion is weak, sensory loss in first web space (reflexes, inversion eversion normal)
2. Common peroneal - Dorsiflexion and eversion weak , sensory on foot dorsum and lateral calf (reflexes, plantar flexion and inversion normal)
3. Sciatic Nerve - Dorsiflexion, plantar flexion, inversion eversion all weak, hamstrings also weak , sensory whole foot, all sides of calf, some part of thigh. ANKLE REFLEX LOST.)
4. ROOT - L5 - dorsiflexion, inversion and eversion also. (ankle reflex normal if s1 not involved)
5. Root s1 - plantar flexion weak

GAIT

1. One leg circles around like Cirumduction - **Hemiplegic Gait**

- Complete the hemiplegia scheme – Lower limbs motor, upper limb motor screening, cranial nerves, pulse BP carotid precordium

2. Scissoring Gait - both legs circles around and foot land in front of other leg - **Spastic paraparesis**

- Complete paraparesis scheme – Lower limb Motor + Sensory, Screen upper limbs and Cranial Nerves, cerebellum, spine lymph nodes

3. both legs drag along **Flaccid Paraparesis**

- Complete paraparesis scheme – Lower limb Motor + Sensory, screen upper limbs and Cranial Nerves, Resting tachycardia, Orthostatic hypotension

4. Ataxic Gait - Broad base, imbalance and swaying - **Cerebellar**

- Perform Romberg test, Tandem walk
- then Complete paraparesis scheme - Lower Limb Motor + sensory, Screen upper limb and Cranial nerves
- Pes cavus, precordium for hcm

5. Waddling - If right leg ia bearing weight, Head tilts ro right and Pelvis drops on left side, when left leg is bearing weight opposite happen - **Bilateral Proximal Myopathy**

- – (Unilateral proximal myopathy gait is called Trendelenburg gait)
- Perform Gower test and Complete Fatiguability scheme

6. High stepage gait - pt lifts leg higher, to prevent foot dragging along ground – **Foot Drop**

7. Stamping Gait – patient lifts foot and hit the ground with more force, like stamping, in attempt to compensate for loss of proprioception – **Neuropathy gait**

- perform Romberg and Gower
- then complete paraparesis scheme
- special focus on gloves and stocking sensory loss

8. Festinating gait - slow to start, short steps, flexed posture, difficulty in stopping and also in turning, if an object comes in way, patient freezes, less arm swing – Extra pyramid or **Parkinson Gait**

- Perform Parkinson scheme
- HANDS - Tremors, Rigidity, Bradykinesia

- FACE - Expression less, Blinking, Vertical gaze palsy and nystagmus, Speech, memory
 - Legs - Tremor, rigidity, Bradykinesia
 - Offer orthostatic BP
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AUTONOMIC NEUROPATHY

1. Pulse - Resting tachy, No variation in response to valsalva, deep breathing, Sustained handgrip
 2. BP - Postural hypo, Syncope (Postural hypo but no compensatory tachycardia)
- With Cardiac monitor – BP response to Valsalva, Deep respiration 6/minute, and tilt table
3. Skin - ↑ or ↓ sweating, facial flushing
 4. Ocular - Pupil size regulation in darkness
 5. Abdominal tenderness, absent bowel sounds
 6. Palpable Bladder
- Elastic socks or stockings, salt intake, sleep in semierect position
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 - **management options**
 - Fludrocortisone 0.1 mg Tablet OD (max 0.5 OD)
 - Droxidopa, Ephedrine
 - Caffeine for postprandial hypotension
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MEDIAN NERVE

- Finger, wrist flexion, APE Hand, Sensory of palmar aspect of radial 3.5 fingers, and dorsal tips
 - ***Ulnar*** - Fine movements, finger adduction, abduction, ulnar deviation, sensory of medial 2 fingers palmar and dorsum
 - ***Small muscles***
1. Lumbricals - Flexion of MCP and extension of PIP DIP
- index and middle by Median nerve, Ring and little by Ulnar
2. Interossei - Ulnar nerve
- PAD DAB - Palmar adducts, dorsum abducts